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ABSTRACT

This issue, number 41 in the series, is divided into the sections of: (1) British science activities, and (2) overseas and international activities. Presented in a newsletter format, numerous topics of interest to secondary school science and mathematics educators pertaining to British education are presented. Items concerning the Nuffield-Chelsea Curriculum Trust, Council for Environmental Education Conference, Calculator In-Service Training Kits, and various mathematics conference reports, are included. The second section includes news items from the countries of India, Scandinavia, Nigeria, Nova Scotia, Bhopal, Swaziland, and South Africa as well as various international conference reports. (CS)

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Science Education Newsletter

Issued by the
Education and Science Division
The British Council

U S DEPARTMENT OF HEALTH,
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

January 1980

No 41

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Contents

Activities in Britain

1 The Nuffield-Chelsea Curriculum Trust

2 CLEAPSE Development Group, Brunel University, Uxbridge UB8 3PH

3 Scotland: Science Teacher Education Materials (STEM)

4 Nuffield Science 13 to 16

5 Council for Environmental Education: 'Fieldwork in the 'A' level syllabus' Conference, Aston 1979

6 Applications of Science and Mathematics to Industry and Technology (ASMIT)

7 University of Bristol: Centre for Overseas Studies

8 Polytechnic of the South Bank: MSc in Mathematical Education (Part-time)

9 BP packs for speakers

10 Young Engineer for Britain 1980

11 Twenty-second London International Youth Science Fortnight

12 Sherman Theatre, University College, Cardiff, Science Week

13 List of 16mm Films on Mathematical Subjects

14 SMP Calculator Series

15 SMP In-Service Training Kits

16 British Computer Society Computer Education Group Conference, Nottingham 1980

17 Twenty-first International Mathematics Olympiad

18 Fife Mathematics Project

19 PUBLICATIONS

Overseas and International Activities

20 CASME awards for Science and Mathematics teachers 1978/79

21 India: Science Education Project (NCERT)

22 News from Scandinavia

23 India: Project Technology

24 Directory of Low Cost Science Teaching Centres

25 News from RECSAM, July 1979

26 Nigeria: The Bendel Schools Science Project Competition

27 Third World Science

28 Cultural Contexts of Science and Mathematics Education

29 Chemical Education in the Coming Decades

30 European Education Cooperation and the UK

31 Water pollution in Environmental Education Curricula

32 International symposium on trends in science education, Halifax, Nova Scotia, August 1979

33 Science Education Workshop, Bhopal

34 Report of International Seminar in Mathematics Education: Development of Teaching Materials for School Mathematics, Swaziland, 1979.

35 Directory of Science Teachers' Associations Worldwide

36 ICASE Europe: energy and environment education in Europe seminar: Monte Carlo, March 1981

37 Correction — International Conference on Chemical Education: Dublin, August 1979 (SEN 40:40)

38 South Africa: Science Education Project News (SEN 38.19, 40.31)

STOP PRESS

39 Association of Teachers of Mathematics (UK): Easter course, Bognor Regis, 1980

40 ASE Annual Meeting, Hull 1980: British Council Symposium: The message and the medium (SEN 39.41, 40.1)

1 THE NUFFIELD-CHELSEA CURRICULUM TRUST

This new educational charity was formally incorporated on 5 September 1979. It is intended by its founding partners, the Nuffield Foundation and Chelsea College, to assume immediate responsibility for the publication and the renewal (which is a continuous process) of the existing Nuffield courses in science and mathematics. These courses have been developed in the past twenty years by the Nuffield Science Teaching Project and the Nuffield Mathematics Teaching Project. The NCCT also takes over immediate responsibility for science and mathematics courses still in development.

The Nuffield Science and Mathematics Projects followed from the ambitions of certain groups of teachers (in the late 1950s) to bring about a far-reaching improvement of the Ordinary-level GCE courses in Biology, Chemistry and Physics, and a general enlivening of the teaching of mathematics in primary schools. From 1962, the groups of teachers and others responsible for these developments were supported by the Nuffield Foundation and their projects were managed directly by the Foundation. With the appointment of Professor K W Keohane (then Professor of Physics at Chelsea College) as Co-ordinator of the Science Teaching Project in 1966, and the appointment of Dr Geoffrey Matthews as Professor of Mathematics Education at Chelsea College in 1968, the work of the two projects came increasingly to be based at Chelsea. This state of affairs was formalized by an agreement between the Foundation and the College in 1971, under which the Foundation retained ultimate financial responsibility for the two projects, and the College assumed responsibility for the work of those engaged on the maintenance of existing courses and the development of new courses.

For the past several years, new ventures and projects in curriculum renewal and development have been supported by the revenues from curriculum materials already published, and further direct support from the Nuffield Foundation has not been necessary.

The creation of the NCCT is a natural development. The new trust will be an educational charity in its own right, constitutionally independent of its founding partners. Its policy will be responsibility of a Board of seven Governors, the first chairman of which is Professor K W Keohane, now the Principal of the Roehampton Institute of Higher Education. The Nuffield Foundation and Chelsea College have each appointed three Governors to the Board.

The founding partners are confident that the new trust will have at its command resources sufficient to maintain existing courses and to carry out a modest programme of new curriculum development. Copyrights in existing materials developed by the Nuffield Science and Mathematics Teaching Projects have been transferred to the new trust, as have the funds earmarked by the Foundation for further curriculum development. One of these is, for example, a new course in Home Economics, intended to impart to the teaching of this subject some of the scientific understanding of matters such as nutrition and energy now thought to be essential.

The Nuffield-Chelsea Curriculum Trust will follow the methods of work found successful by the Nuffield Science and Mathematics Teaching Projects in the past twenty years. It will continue to rely on groups of practising teachers and other educational advisers for advice on educational needs.

The renewal of existing materials and the development of new curricula will be entrusted to small groups of teachers and others, working together as a team and usually advised by a small but representative expert committee.

The testing of new materials in representative schools by practising teachers will remain an indispensable part of the process of curriculum development.

Throughout, the objective of all revisions and new developments will be to help teachers ensure that students understand, enjoy, and use what they learn.

The NCCT will employ a full-time staff to manage its affairs, and will continue to pay particular regard to the design and production of the materials published in its name, principally by means of its full-time editorial team.

The NCCT is also anxious that it should build on the strong but sensitive links with practising teachers which have been the basis of the success of the Nuffield Science and Mathematics Teaching Projects in the past two decades. The new trust is anxious that all those with informed opinions on the improvement and enlivenment of science and mathematics teaching should know that these will be welcome. The NCCT looks for a continuation of friendly relationships with the Association for Science Education and other professional organizations.

The Chief Educational Consultant to the Trust is Professor P J Black, Professor of Science Education at Chelsea College, who will be the Chairman of the Advisory Committee now being formed to advise the Governors on matters of general educational policy.

Correspondence from all will be welcome, and should be addressed to:

The Nuffield-Chelsea Curriculum Trust
Chelsea Colelge
88—90 Lillie Road
London SW6 7SS

2 CLEAPSE DEVELOPMENT GROUP, BRUNEL UNIVERSITY, UXBRIDGE UB8 3PH

Although based at a well known university, this centre is supported by Local Education Authorities and one of its main functions is the provision of a science equipment information service for schools. Other persons may receive this information by payment of a subscription.

Past interests have included equipment for secondary schools but in the future there will be some attention given to the primary and middle years of science education.

Current reviews of equipment which have been received include the following confidential reports:

L107A Newton Meters
This contains a description of the new nylon super Samson range, now stocked by main suppliers.

L127B Photography — Darkroom Work
This completes the report on photography with advice on setting up a darkroom, electrical safety and evalu-

ation of enlargers and other equipment. The emphasis is on black and white work but a guide to colour is included.

L129 Middle School Science Kits
Descriptions of the Craigie kit and new kits from E J Arnold have been added and prices updated.

L133 Replacements for Asbestos Products
This is a revised version of a previous report with up to date prices to include new alternatives for bench, mats, gauzes and paper.

L135 Eye Protection for Science Laboratories
Two previously published addenda have been incorporated in the text and all prices updated. The introductory part of the report has been amended in places and now includes information from factory inspectors of the health and safety executive.

L151 Ammeters etc
The choice of ammeters, voltmeters, galvanometers and multi purpose meters for class sets mainly for pre-sixth form science work is discussed.

3 SCIENCE TEACHER EDUCATION MATERIALS (STEM)

Although a science teacher education project, this Scottish initiative is not an adaptation of its English counterpart but is related to the needs of secondary science teaching in Scotland.

Support is provided by the staff of colleges of education, the Committee of Principals, The Scottish Curriculum Development Service and the Inspectorate.

40 units have been produced merely for use in in-service training but in the long term they will be available for school use. The units deal with such topics as management, curriculum design, lesson planning, group work, language in science, safety and technicians.

The Part-time co-ordinator of the Project is Sandy Sloss at Dundee College of Education, Gardyne Road, Dundee.

4 NUFFIELD SCIENCE 13 TO 16

This integrated science course is written for pupils of average ability in forms 3 — 5 of secondary school. Five modules of part 1 published this year, can be covered in each term, assuming three double periods a week for the course timetable. The publishers provide a reference set of the modules, so that teachers can study the course and decide their own selections before buying multiple copies of the student materials.

The published titles include Senses, Particles, Organisms, Energy, Breathing and Circulation, Hearing and sound, Atoms and molecules, Seeing and light, Machines and engines, Communities and populations, Food and digestion, Charged particles, Competition and predation, Magnetism and electricity, and What do plants use for food?

The course work is firmly rooted in practical investigation and is well illustrated with photographs and line drawings.

'What do plants use for food?' for example, finds practical solutions to the requirements of green plants, why they don't have to look for food, what they do with the energy they trap, what the products are, and what other things help successful food production.

The 15 modules of Part I, each consisting of pupil's booklet and teaching notes, are available for £15.00 from:

Longman Resources Unit
33—35 Tanner Row
York

Parts 2 and 3 will follow.

5 COUNCIL FOR ENVIRONMENTAL EDUCATION: 'FIELDWORK IN THE A LEVEL SYLLABUS' CONFERENCE, ASTON 1979

The report of this one-day conference includes the speakers' papers, three of which are summarised below.

The Aims of Field Work by C A sinker, Field Studies Council

This interesting paper contrasts the arguments for and against field work in school teaching after defining the scope of the topic.

On the one hand, field work can be self motivating and infectious with the power to establish previous learning in a practical setting. In a typical situation, there is a very rich range of resources for topic work. Personal experience of the size and scale of various features is unique. Developing logical processes, illustrating concepts, technical training and the conservation ethic are important considerations. The arguments against field work concern first isolation: ecology is often treated as a separate block. The complexity of the field situation can be a burden for the inexperienced teacher. Trivialisation and weak reasoning and the limited knowledge of territory can be inhibitory. There is a tendency to regard incompatible field data as wrong in relation to known theory. Student pressure on popular field work sites can inhibit the environment ethic. Persons living in the neighbourhood may be alienated. There may be health and safety hazards for students in particular field situations.

The article concludes with a concise statement of criteria and aims for field work.

The Problems of Assessment by J T Price, Senior Secondary Adviser, Wiltshire

Methods of marking and the use of continuous assessment in A level project work are described.

The criteria of assessment of a special study depend on originality, quality of understanding and insight into topic, presentation and procedures used.

The Provision of Field Work Facilities for A level Students by S McB Carson. County Adviser for Environmental Education, Herts

A survey based on replies from 56 local education authorities shows that 59% of them have centres of their own for fieldwork 68% of the authorities support students

going to other centres, 5 authorities do not make provision for field work.

The author then provides detailed information about the degree of utilisation of field work facilities.

Constraints in the use of Field Study Council Centres include high costs, lack of adequate time provision for field work in the school curriculum, low and variable valuation of field work in examinations, teacher involvement is limited by availability of extra renumeration for field work during holidays.

A great deal can be done to encourage cheaper field work studies in school grounds.

The report is printed in the Summer 1979 issue of REED, published by the CEE, School of Education, University of Reading, London Road, Reading RG1 5AQ. (£1.50 per year, 3 issues) or it is available separately.

6 APPLICATIONS OF SCIENCE AND MATHEMATICS TO INDUSTRY AND TECHNOLOGY (ASMIT)

The first draft, which is no longer available consists essentially of a series of texts printed on stout card which describe various technology topics, ranging from the science of brewing and the making of ice cream, to the chemistry of dyestuffs and the use of radioisotopes. Each card is properly indexed both in numerical terms and with side margin headings for easy reference. The text is, in each case, intended to provide a description of the subject principles with an illustrated technical application. The teacher of science or mathematics is thus provided with a brief but essential fund of background material for his teaching in technology. The cards are punched and can be detached from the main texts for use singly.

The Association for Science Education plans to amend and add to the existing set of cards before reprinting. The Editor would welcome further contributions. Please write to:

Brian Nicholl
91 Middle Park Road
Birmingham B29 4BP

7 UNIVERSITY OF BRISTOL: CENTRE FOR OVERSEAS STUDIES

The Centre for Overseas Studies at the University of Bristol is based in the Division of Advanced Studies within the School of Education. Interests within the Centre cover a wide range of problems facing Overseas educators and a strong involvement with Science Education Development has been built up as a result of experiences of the members of the Centre in many countries as teachers, lecturers, advisers, inspectors and consultants.

Specific courses are offered in Science Education Overseas at Advanced Diploma level, with an emphasis on Curriculum Development. A taught M.Ed., also has a strong overseas Science Education element and there are ample opportunities for suitably qualified science educators to read for research degrees at M.Ed., and Ph.D., levels. A B.Ed., programme is also offered which meets the needs of the overseas student.

The Centre is sufficiently flexible to be able to mount special study programmes lasting any mutually convenient length of time, particularly for senior educationalists in a wide range of fields. These can either be certificated courses leading for example to the Advanced Certificate in Education, or non-certificated study attachments. Such courses can be tailored to meet individual needs and the Centre would welcome enquiries, from individuals or groups, as to how particular needs could be catered for.

The interests of the members of the Centre cover most areas of the developing world with particular expertise being offered in African, Caribbean and Asian studies. However, it is now possible to extend our interests to Latin America and any enquiries from that region would be particularly welcome.

Further information, full details of all the courses offered and a list of the research interests of the Centre can be obtained from:

The Secretary
Centre for Overseas Studies
School of Education
35 Berkeley Square Bristol BS8 1JA

8 POLYTECHNIC OF THE SOUTH BANK: M.Sc. IN MATHEMATICAL EDUCATION (Part-Time)

This important course provides an opportunity to study such diverse areas as the structure and nature of mathematics, applications of mathematics to new areas in the physical and social sciences, analysis of mathematics curricula and the psychological factors involved in problem solving. It also enables teachers to study and experiment with the latest techniques available in teaching mathematics, such as the use of computers as an aid to learning.

Mode of attendance

The course extends over two years and one term and attendance is required on one afternoon and evening (same day) and on one other evening. The seventh term, used for project completion, will have more relaxed attendance requirements (usually by arrangement with the project supervisor).

Admission requirements

Normally an honours degree in mathematics or other qualification with appropriate mathematical background (e.g. B.Sc. in Physics, or any engineering degree with mathematics as a specialisation). In addition each applicant is expected to have teaching qualification and two years teaching experience in mathematics; in the absence of the teaching qualification, to have had three years teaching experience in mathematics.

Assessment

There will be four examination papers which will be taken at the end of the second year of the course. Assessed course-work will also be set and commencing in the second year a project (or dissertation) will be undertaken.

Further information from:

K H Oke, BSc., M.Tech., FIMA.,
Polytechnic of the South Bank
Borough Road London SE1 0AA

9 BP PACKS FOR SPEAKERS

Speakers' packs have been produced to assist the BP employees called upon to give talks on the company and its activities. Each pack contains handouts, a script, a question and answer sheet and a carousel of colour slides.

Packs available so far (to all BP companies world-wide) are 'The Story of BP', 'Choosing your career' and 'Energy Crisis 2000'.

Anyone interested in producing similar packs may contact:

Sandy McDowall
BP, Room 04148
Britannic House
Moor Lane
London EC2Y 9BU

10 YOUNG ENGINEER FOR BRITAIN 1980

This competition is open to boys and girls from age 14 to 19 from schools, colleges, polytechnics, University and industry. Entries are accepted from individuals or groups of up to four, in one of three classes based on age. They can be of a mechanical, chemical or electronic nature and should aim to improve industrial production, have commercial potential, save waste or improve an existing process.

All competitors take their project to one of the Regional Finals held in June and July. The best projects will then be entered for the National Final later in the year.

Further information is available from:

Mr Brian Nicholl
c/o University of Birmingham
Department of Physical Metallurgy and
Science of Materials
Elms Road
North Compus
PO Box 363
Birmingham B15 2TT

11 TWENTY-SECOND LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT

This will take place from 30 July to 13 August 1980. Participants should be between 16 and 22 years old. The cost, including residence, will be approx £225.

The aim of the Fortnight is to give a deeper insight into Science and its applications for the benefit of mankind, and to develop a greater understanding between young people of all nations. The programme includes lectures, seminars, visits and discussions, as well as social events.

Further information and applications forms are available from:

The Council for International Contact
9 Grosvenor Gardens
London SW1

12 SHERMAN THEATRE, UNIVERSITY COLLEGE, CARDIFF, SCIENCE WEEK

The theatre sets aside one week every other year to be devoted to Science activities. This year the programme included scientific entertainment, lecture demonstrations, public discussins and the finals of a Bridge Building Competition. Events were included for 11 — 18 year olds in different age groups, and for the general public.

Some of the topics were:

'From waggling to Waltzing: biological origins of the dance'

'Fat: the good, the bad and the ugly'

'The making and breaking of plastics'

'Utilisation of waste'.

Further information can be obtained from:

Professor J Beetlestone
Education Department
University College
PO Box 78
Cardiff CF1 1XL

13 LIST OF 16mm FILMS ON MATHEMATICAL SUBJECTS

This comprehensive list includes films concerned with mathematical education, and is available free of charge from:

Mr David Singmaster
Faculty of Mathematics
The Open University
Walton Hall
Milton Keynes MK7 6AA

14 SMP CALCULATOR SERIES

The School Mathematics Project has produced a series of small books on the use of calculators in secondary school mathematics. They are written primarily for students and teachers following the SMP O-level course alternative syllabus C, for which electronic calculators are required. However, they will also be of interest to anyone concerned with a secondary mathematics syllabus involving the use of calculators:—

1	Discover How To Use Your Electronic Calculator	£0.55p
2	Growth and Decay: Financial and other Applications	£0.55p
3	Sequences and Interactive Processes	£0.65p
4	Calculator Supplement by Topics	£0.65p
5	Calculator Supplement to Books X, Y and Z	£0.65p
6	Teacher's Guide for the SMP Calculator Series	£3.50p

The books are published by Cambridge University Press, from whom further information may be obtained at CUP, PO Box 110, Cambridge CB2 3RL.

15 SMP IN-SERVICE TRAINING KITS

The School Mathematics Project has produced a number of In-service training Kits in draft form. The titles so far available are: Fractions, Number Bases, On Being Sure, Directed Numbers, Matrices. Other titles are in preparation.

The kits are being tried out in Britain by various people involved in in-service training of mathematics teachers, such as Heads of Mathematics Departments, local advisers, and in Teachers' Centres. The kits will then be modified and improved.

Further information may be obtained from:

Mr John Hersee
SMP
Westfield College
Kidderpore Avenue
London NW3 7ST

16 BRITISH COMPUTER SOCIETY COMPUTER EDUCATION GROUP CONFERENCE: NOTTINGHAM 1980

The fifth national biennial conference is to be held at Nottingham University from April 10 — 12. The theme 'Computers in the Classroom' recognises the impact of microprocessors in schools, and should appeal equally to specialists and non-specialists.

There will be opportunity for members to join smaller groups to consider such topics as: computing for the specialist, computing across the curriculum, and computer awareness.

Application should be made to:

Computer Education Group
North Staffs Polytechnic Computer Centre
Blackheath Lane
Stafford ST18 0AD

17 TWENTY-FIRST INTERNATIONAL MATHEMATICS OLYMPIAD

Twenty-two countries* participated in the XXI IMO held in London in July, 1979. The principal sponsors of the Olympiad were the Trustees of the School Mathematics Project, with generous financial support from the Department of Education and Science and from the Royal Society, the British Council, industry and schools. The International Jury, made up of the Leaders of the teams under the chairmanship of Dr T J Fletcher, HMI did its preliminary work of setting the problems for the competition in Bristol. The competition itself was held at Westfield College, London, where the teams, each of eight pupils, were accommodated during the first week of their visit; the final two days were spent in Oxford at Keble College and Lady Margaret Hall.

Not only was there a record number of participating countries but this IMO was notable also for the fact that it was the first in which a team from a South American country had competed. Although the IMO is officially an individual competition the unofficial team order was headed by the USSR, followed by Romania and West Germany, with Great Britain placed fourth. The individual best performance, recognised by the award of a Special Prize, was by Le Ba Khanh Trinh of Viet Nam.

There is, as yet, no information on the venue for the IMO in 1980, but it is hoped that the USA will be host in 1981.

*Austria, Belgium, Bulgaria, Brazil, Cuba, Czechoslovakia, France, Finland, Federal Republic of Germany, German Democratic Republic, Greece, Hungary, Israel, Netherlands, Poland, Romania, Sweden, Soviet Union, USA, Vietnam, Yugoslavia.

18 FIFE MATHEMATICS PROJECT (SEN 24: 11.5)

These materials, previously published by DIME, University of Stirling, are now to be obtained from:

Oliver and Boyd
Croythorne House
23 Ravelston Terrace
Edinburgh EH4 3TJ

19 PUBLICATIONS

19.1 Social pressure and curriculum innovation by Mary Waring, published by Methuen, 1979, at £4.95 (paperback)

At one level this is a history of the Nuffield Foundation Science Teaching Project. The work of the chemistry team in particular is taken as an example of the process which led eventually to the publication of the great range and variety of courses and resources which we know as 'Nuffield Science'. As such, it is a fine example of what a project history can be. Mary Waring initially paints a broad canvas, tracing thinking in science education from the last century, and describing the mounting pressures of social, economic, and political influences which culminated in a few hectic months — September 1961 to April 1962 — when professional bodies, industry, and government together coordinated the expertise, the means, and the will to establish the project. The actual development process of the chemistry project is worked in much finer detail. Based on a study of all available documents, and on many hours of personal interviews with key figures of the project, the account achieves a balance of objectively recorded fact and anecdotal detail which makes it an eminently readable record of events.

But this book is much more than a history. The analysis of development and implementation phases of the chemistry team's work contains many lessons for anyone involved in curriculum work in any part of the world. It is fascinating to follow the shifts in plans, the influence of individuals, the mistakes and the successes while the materials were being planned, drafted, and trialled. It is revealing, for instance, to read of the manner in which the 'mole problem' was swept under the carpet in spite of considerable negative feedback from trials teachers, of the surprise of the headquarters team that teachers should demand so much detail of experimental and teaching procedures, and of the overestimation of the effect on teachers of short term courses.

The picture of a headquarters team too busy getting on with the job of processing feedback, rewriting material,

and organising conferences to do the necessary public relations and publicity will be familiar to many who have worked on curriculum projects. One lives the project so intensely at the centre that one cannot imagine that the whole world has not heard of it. In fact the Nuffield Project was accused of undue *secrecy* after two years of unremitting work!

There are many other such lessons to be learned from this book, which make it required reading for anyone involved in curriculum innovation or dissemination. Perhaps the most telling is the influence of a few key individuals. Their perceptions and personalities frame the philosophy, shape responses to feedback, and dominate the course of project development. Herein lies both the strengths and weaknesses of centralised curriculum projects.

19.2 Mathematics and the 10 Year Old by Murray Ward, published by Evans/Methuen Educational, for the Schools Council 1979 at £4.25.

This book gives a clear and interesting account of the Schools Council Primary School Mathematics: Evaluation Studies Project. The project looked at childrens' competence in mathematics as well as investigating teachers attitudes and opinions. Teachers reading this book will find 'not only a general picture of the current state of primary mathematics but also some indications of the skills and mathematical processes that are in need of more attention or different teaching approaches'.

19.3 Certificate Mathematics — Units M1 and M12 by Modular Mathematics Organization, published by Heinemann Educational Books, 1979, available as one book at £2.95 or individually at £0.50 each. These units have been written to follow Modular Mathematics 1 — 36 and are suitable for O-level courses. Each topic is clearly presented with the aid of a great many diagrams.

19.4 Profile of Mathematical Skills (Levels 1 and 2) by Norman France, published by Nelson & Sons 1979, specimen set at £1.60. These are 'criterion referenced tests in mathematics for which pupils achievement on the criteria have been established and measured'. The tests are (Level 1) for 3rd Year Primary and (Level 2) for 2nd Year Secondary and have been standardised using a large representative sample of the 1978 UK, school population. The profiles also provide a diagnostic tool for assessing individuals abilities, skills and weaknesses. The tests measure depth of understanding — not speed of working. The tests sheets are explained for the teacher in a Teacher's Guide.

19.5 Tests from the Mathematical Association, 1979, available from the Association, 259 London Road, Leicester, at £1.00.

The Mathematical Association (UK) has published a report on standardised tests in mathematics. The report has been published in the form of a 42 page review with comments on different kinds of tests available and some examples have been reproduced. It is concisely written and full of information of use to teachers of mathematics who wish to use standardised tests: for example to compare internal school standards from year to year or to compare with national norms; diagnosing weaknesses; detection of latent talent; checking mastery of skills or concepts.

19.6 Mathematics 5—11 — a Handbook of Suggestions, from the Department of Education and Science, published HMSO, 1979, at £2.75.

The booklet of 83 pages attempts to identify those parts of mathematics which in HMI's view should be taught to every child. It offers guidance on approaches to teaching the subject and surveys additional topics and aspects of mathematics being successfully taught in many schools. This booklet provides very useful and succinct suggestions and should be welcomed by all concerned with the teaching of primary mathematics.

19.7 Design Technology in Metal and Plastics by G H Thomas, published by John Murray, 1979, price £2.95.

The author presents a case firmly geared to problem solving and creative thinking in modern craft teaching.

Design creativity is taken to mean going back to fundamentals and thinking through a project from beginning to end for oneself. This design-based course provides the opportunities for this.

The student must produce an article that fulfils a desired function, is aesthetically pleasing and makes use of the materials and tools available. The student has to think, solve and create, visualising the end product, and synthesize a feasible design. The construction is then planned and executed. There follows an evaluation which gives meaning to everything he has done.

The present volume is divided into steps providing initial puzzles and problems which increase in complexity and these are followed by ideas for fitments and furniture, in outline without working drawings, to create constructional problems.

The book is a rich source of ideas for design courses.

19.8 Teaching Primary Science by B L Young, published by Longman Group Ltd, 1979, at £2.90.

Beverley Young worked for four years at the Institute of Education, Ahmadu Bello University in Zaria, Nigeria and during that time gained a wide and direct experience of primary teacher training in the Northern Nigeria setting.

The present volume of 217 pages represents a wide approach to primary science teaching based on the process approach. Chapter headings include approaches to primary science, how do children learn science and other subjects, the physical conditions for teaching, planning science lessons, useful techniques, problem solving, planning schemes of work, evaluating your children's progress etc.

The text is directly related to local conditions in taking account of language, apparatus and resources available and provides questions for Nigerian examinations.

It is a book which most teachers can begin to use with a minimum of instruction. They will derive considerable benefit from gaining insights into the wide range of science teaching methods which are described here.

This book fulfils a long felt need in providing an elementary account of modern science teaching methods for the many teacher training institutions in developing countries.

It draws together the many aspects of psychology, philosophy and sociology and presents a practical manual of instructions.

19.9 Resource Book of Test items in Biology by Professor E Perrott, D Hughes Evans and Ian D Campbell, published by John Murray, 1979, at £3.95.

Not a book of tests but a sourcebook of test items, linked to the previously published text 'Biology — An Environmental Approach' which drew inspiration from BSCS Green Version text from USA.

The question items in each section are listed in two sections:

Information and definitions
Application and enquiry approaches

The units follow the original textbook previously mentioned and deal with The World of Life — The Biosphere, Diversity among Living Things, Pattern in the Living World, Looking into Organisms, Man and his Environment.

There is a useful introduction to preparing tests and the analysis of tests for those unfamiliar with such terms as 'discrimination index' and the 'difficulty factor'.

19.10 Teaching Science to Infants by Romola Shewell, published by Word Lock Educational, 1979, at £3.95.

The author makes an appropriate point, in teaching science to young children, that all work must have an aim and a reasonable outcome, bearing in mind what we can reasonably expect as a response from a particular child. A plea is made for physical science as well as nature study but some may quarrel with the insistence on accuracy.

The book is a set of topics which can be exploited with infants using everyday apparatus, eg growing things, see how they grow, a look at soil, looking at a tree, colours, time things, wheels, tools and machines, walls, something about sound, hedgerows, wet weather etc.

Each section contains background notes, planning and preparation, working and recording, and support materials. One can hope that this excellent little book will encourage more teachers in primary schools to use science topics.

19.11 This is Science Books 1 and 2, and Teachers Guide by K Dobson, published by Macmillan Education at £1.80 each for pupil's books, £4.95 for Teacher's guide.

A refreshing and sanguine statement by Mr Dobson in his introduction, summarises the special flavour of his approach to science teaching. He found that in his teaching to mixed ability groups that a boy with the lowest reading age in an eight form intake was the one to solve the dimmer experiment using the Nuffield circuit board.

He therefore presents a integrated science course with discovery methodology firmly placed in a structure of factual information and understanding, with attention given to simplified language and communication. Worksheets are provided but are not essential; in fact a variety of teaching strategies linked with good classroom organisation are a key-note of the teacher's guide.

The course of study is for 11 and 12 year olds and leads to the Nuffield O level courses. The content has chapters in common with Nuffield Combined Science and the Scottish Integrated Science Programme, but in a different sequence.

19.12 Food, Feeding and Digestion (Biology for the Individual, 10), by Philip Booth, published by Heinemann Educational Books, 1979, at £1.60.

By now a well known series, the present volume represents a continuation of the original 8 texts which were produced as part of a teaching project initiated by the Nuffield Resources for Learning Project. This later book is intended to stimulate resource based learning for the 13-17 age group in a wide variety of school biology courses for the GCE and CSE Biology and Human Biology examinations in Britain.

There is no teachers' guide to accompany this volume but teachers notes about apparatus and relevant specimens are added as an appendix to the students texts.

The content deals with animal feeding methods, the food requirements of animals and the digestion of food, with many examples of large clear line drawings which are used to illustrate experiments, and provide a basis for questions and summaries.

19.13 Caribbean Agricultural Science Books 1 and 2, by A I Henry published by Macmillan Administration (Basingstoke) Ltd 1979, at £2.25 each.

The author was formerly head of the Department of Agricultural Education in the School of Agriculture in Jamaica and the two volumes prepare secondary school students for the requirements of the Caribbean examinations Council. The former volume deals with biological principals in a form suitable for use in the junior secondary school. The content deals with Soil, The Plant, The Animal, Agricultural Engineering and Agricultural Economics with basic descriptions of structure and function, various types of revision questions and exercises are included. It is worth noting that the author was for many years Chief Examiner for Agriculture for Jamaica and is currently on the panel of examiners of the Cambridge Overseas Examination Syndicate for Agricultural Science.

The second volume of the series deals with such topics as farming systems, soil management, crop culture, livestock rearing, machine equipment and building, farm management and marketing. There is much new material here and many of the descriptions will have a wide application in tropical countries. The text is profusely illustrated with clear photographs and drawings and a similar series of questions and revision exercises is provided.

19.14 Steps in Physics by John Byron, published by Oxford University Press, 1979, at £2.50.

This new text written by the former Head of Science at Rainford High School, St Helens provides a basic course for the CSE examinations.

The important factor in the material is the stylish format; the text is both neat and clear with a profusion of well labelled line drawings supplemented by photographs which provide evidence of scientific applications in daily life.

Considering the detail, each topic extends over a double page as a discrete unit. The teacher can thus manipulate small teaching units in a variety of ways and each unit provides an essential set of information followed by examples of exercises to reinforce the content.

The author stresses the correct use of a textbook, in terms of searching for information, by intelligent use of the contents list and the page index, a factor not often stressed and which enhances the value of an attractive text providing a background for experimentaion.

19.15 Chemical Nomenclature. Symbols and Terminology published by The Association for Science Education, 1979, at £1.25.

The first edition of this useful text was published by a Working Party of the Education Research Committee of the Association for Science Education under the leadership of Mr C G Smith. A similar group have now revised the original set of proposals in the light of accumulated comments and criticism.

The original IUPAC rules were drawn up to enable research workers to name new chemical compounds systematically: the many refinements are not all of interest to those carrying out the exercise at secondary school level. There are complications in the availability of systematic and non systematic names for organic compounds and a dual system for the naming of inorganic compounds.

The first edition, and now its sequel, provide guidance through this complex situation. The contents have been used in the past by examining boards for setting examination questions as well as by textbook writers.

19.16 Assessment questions for Integrated Science, by Stewart Kellington, published by Heinemann Educational Books, 1979, at £0.95 for Books 1 and 2, and £2.50 for Teachers' guide.

Books 1 & 2 of the series contain a resource bank of different kinds of questions for the use of science teachers who are prosecuting the Scottish Integrated Science Programme.

Their preparation, editing and validation, occupied five years, and it is a real benefit to have questions generally available which have been properly validated for use in certain defined conditions. The author feels that the questions will in fact have a much wider application in other science courses for the first two years of secondary school.

The Teachers' Guide volume provides a valuable set of guidelines for the inexperienced teacher, through a consideration of criterion referenced methods, the analysis of test results and the construction and maintenance of a question bank.

The appendices to the teachers' guide contain lists of technical words, action verbs etc, the requirements of the various practical tests and a comprehensive cross reference section which relates the textual material of the Scottish integrated science programme with the application of the questions themselves.

19.17 Hong Kong Science Teachers Journal published by Hong Kong Science Teachers Association, Vol 7 No 1, June 1979.

This informative and lively journal continues on its way with articles in the current volume dealing with world energy supplies, space museums, the use of local parks and gardens in biology teaching as well as seminal articles such as 'What is Science Teaching About', 'Inductive Teaching How, Why and When', and the Weighting of Examination papers.

A series of articles by K M Chon (Raimondi College) begins with a description of a home made magnetic stirrer and a voltmeter for the teaching of electro-chemistry at advanced level.

Charles Payne (Wa Ying College) describes the computer revolution and makes a case for the use of modern computers in the classroom. He uses a micro-computer for mathematical and scientific applications in lesson work and the unit is used by teachers for calculating marks and grades. He would like to know from others who are using micro-computers (BASIC) for timetable work.

19.18 The Science Teacher Vol 23 No 1 & 2. October/December 1979 published by Junior Club Publications Ltd, 36 Craven Street, London, WC2N 5NG for Commonwealth Association of Science and Mathematics Educators.

The current volume contains several interesting articles including the following:

1 Factors influencing Primary Student Teachers Appreciation of Science, by H I G Crowther and P F W Preece, School of Education, University, University of Exeter

There is a general idea that primary school teachers in England are apprehensive about teaching science to their children and this report set out to identify relevant factors which are involved in this conception.

The survey was based on a sample of 960 first and third year student teachers in 10 colleges or polytechnics in England and Wales.

The survey identified that previous teaching at the primary level and non science secondary teaching were not important influences, whereas 60% of the group felt that science teaching at the secondary level was important. Moreover 40% of the group agreed that college science teaching was also an important influence on their scientific appreciation. To a lesser extent, television, radio, books and science literature were also an influence on the situation.

2 Problems posed by the common science curriculum, by Dr J M Wood. Langton High School, Stoke-on-Trent

In the comprehensive situation, and teaching a common curriculum to a full pupil ability range, various devices such as banding systems and setting are in vogue.

However, many teachers fail to relate their knowledge of cognitive development with the appropriate subject content to be taught.

The present writer specifies that each school should identity a common core of science syllabus content and then indicate the depth of study required for different ability groups.

He describes the planning procedures used at Langton to develop these ideas. Expected learning outcomes are derived from Blooms Taxonomy and concept learning based on experience are important factors. To determine the relevance of objectives with learning, three groups of students of different abilities were identified.

Science curriculum schemes already published were examined to identify topic areas and sequencing was derived by compatability, between the learning process, resources and objectives.

The topic subsections were again related to the three groups of students.

3 School Based Environmental Monitoring in Developing Countries, by Gary Knamiller. School of Education, University of Leeds

The author provides an interesting account based on recent experience in West Africa. He exposes a rich wealth of empirical knowledge about the local environment which can be utilised by school children there. Using children's experiences of the local environment would benefit academic work in schools.

The following important points emerge from these preliminary studies:

(i) We need to determine how receptive are local people to the idea of children carrying out local studies. There may be resistance from parents for example, in the W. African situation.

(ii) Interministry cooperation will be needed in the environmental context formulations.

(iii) A degree of uniformity in methods of collecting and reporting environmental data could be a necessity if a common curriculum is to be constructed at a centre; evaluation procedures are needed.

(iv) The school is a suitable monitoring centre for this work which may extend over a comparatively lengthy period of time.

(v) Careful consideration of how the new environment materials are to be introduced into the existing science teaching curriculum, is required.

All this requires future organisation.

19.19 Chem 13 News, edited by D A Briston, R J Fresen and W A E McBryde and published by University of Waterloo, Waterloo, Ontario, Canada N2L 3GI at Canadian dollars 15.00.

Intended as a regular source of reading for Canadian Grade 13 teachers, the current volume represents a collection of the individual Chem 13 volumes which were issued during the first 4 years.

The content deals specifically with the school chemistry course S-17E recently introduced into Canadian High Schools and each news sheet provides teachers with 4 weeks of classroom work and articles reviewing related books, experiments and visual aids etc.

An interesting example of contemporary science teaching in Canada.

OVERSEAS AND INTERNATIONAL ACTIVITIES

20 CASME AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1978/79

Entries were received from:

Bangladesh (1) Barbados (1) Cyprus (1) England (2) India (14) Jamaica (1) Lesotho (1) Malaysia (2) Mauritius (1) New Guinea (1) Sierra Leone (1) Sri Lanka (2)

Judging has now been completed and the results are as follows:-

First Prize (£125)

Mr V J Antony Vellanikaran
Market Road
Ernakulam
Cochin, India, 682011

'Teaching Aids for Developing Countries' — the design manufacture and exhibition of locally produced equipment.

Second Prize (£75)

Mr Trevor Wood
'Glenormes'
7 Gomersal Road
Heckmondwike, West Yorks, WF16 9HU

'The Chemistry Project Club of Batley High School for Boys' — an account of the conception, development and success of a secondary school chemistry club.

Third Prize (Joint) £50

Irene Williams
Kolora Park
Dunsford
Devon EX6 7JV

'Using Solar Energy at the Malawi Polytechnic' — the development of locally produced solar cookers.

and

Mr Charles Singaram
Sekolah Menegah Tun
Fatimah
Johore Bahru, West Malaysia

'A Preliminary Study of Fouling Organisms in the Johore Strait' — an account of colonisation and pollution.

Commended:

Joy Royes
4 Charlemont Avenue
Kingston 6, Jamica W1

'The development of teaching materials aimed at introducing students to Micro-organisms' — a teaching unit for 4th year secondary pupils.

Shrivastava Nano Kishore
STC School
Garhi
(Banswara)
Rajasthan, India

'Preparation for Science and Mathematics Teaching of improvised aids using waste material' — a wide range is described.

Jasper Brian Selwyn and Raymond Andrew Zepp
National University of Lesotho
Poroma 180
Lesotho

'A course in essential mathematics for first year university students' — a course for entrants with weak mathematical background.

Moradhun Teebaye
Tyack
Riviene Des
Anguelles
Mauritius

'Project on New Mathematics in the Primary Schools of Mauritius' — the development of a primary mathematics scheme, with a study of the work of a few pupils over 5 years.

K T Vipina Chandran
Koodali High School
PO Koodali (670592)
Cannancre District
Kerala State

'Some Projects for School Science Exhibition and their Applications in the Village' — a description of a number of original devices.

Emile Eustace Lisk
29B Syke Street
Conootown Freetown
Sierra Leone

'Methods that have been used to teach Sixth-Form Chemistry and Physics where facilities have been limited' — modifications of science teaching are suggested.

21 INDIA: SCIENCE EDUCATION PROJECT (NCERT)

An account of these activities is given in the current issue of the Newsletter of the Asian Centre for Educational Innovation and Development as follows.

13 states and universities in India are taking part in the programme aimed at universalisation of primary education which involves the introduction of new school materials in all the schools in these areas.

A pilot scheme which involves nutrition, health education and environmental sanitation units has been launched from 5 regional centres and is being implemented in 2,500 schools. Evaluation of the project began in 1975 with the setting up of appropriate assessment instruments.

Generally speaking, there are problems in some parts of the country which are related to the translation and the printing in sufficient quantities of the materials in a particular local language. Owing to the size of the population in the schools, there is a problem in the supply of the equipment kits for primary science and the training of sufficient numbers of teachers to implement the programme. A strategy of using local resources for primary science teaching has partly replaced the use of the present version of the equipment kits. The influence of environmental studies is increasing in this activity and NCERT have launched an appropriate in-service training scheme and have given consideration to a new form of the primary science equipment kit with British assistance.

22 NEWS FROM SCANDINAVIA

In Norway, efforts are being undertaken to improve science teaching at the primary level in response to the requirements of many non-specialist women teachers who are interested in the modern science teaching methodology.

The Science Curriculum Improvement Study programme (SCIS) which originated at the University of California, has been modified and translated for the above purpose and the Norwegian version is called 'Meet Nature'.

The third of a series of annual national seminars on Education in Science and Mathematics is also planned in Norway to bring together school teachers from different levels as well as students and parents to discuss the current situation in science and mathematics education.

There is an intention to publish an account of the seminars this year and there is a desire to build up a national network of interest centres throughout Norway.

Denmark is facing up to the problems involved in teaching pupils of mixed ability. The curriculum of the 'Folk Schools' was reformed in 1976, so that now students remain in the same class until Grade 7 then in the final three years to Grade 10 they can make some subject choices. The new physics curriculum for Grades 7-10 follows the modern trend in teaching for understanding emphasising practical work, and enquiry methods.

The teaching of physics in Norwegian grammar schools (Gymnasiam) for ages 16-19 is a student specialisation. The maths-physics line has the strongest degree of specialisation. Chemistry is only taught in year 1 and year 2.

The Swedish school system is based on a 9 year basic school, compulsory and comprehensive. During the first six years, all subjects are taught to all pupils.

There are proposals (LUT 74) that all teachers will be trained to teach mathematics or Swedish in each of the 9 years and should also be able to teach three other subjects. At least 15 months employment is compulsory before entering teacher education.

The proposals in LUT 74 will be formalised at the end of the year but there is some disagreement amongst teachers about effectiveness of the new proposals.

23 INDIA: PROJECT TECHNOLOGY

A workshop was held at Motilal Nehm School of Sports Rai from 25 June to 7 July 1979 with two British tutors Mr F KGroom and Mr P J Osbaldiston from Trent Polytechnic. The organisation of the meeting was in the hands of the Central Board for Secondary Education (CBSE) which has introduced project work as a permanent

feature of the Class XI and XII of the CBSE schools. The projects relate to using readily available local materials and the involvement of high technology using electronics, transducers, and integrated circuits.

The present workshop covered concepts in instrumentation, control technology, food technology, industrial chemistry, chromatography, photo-elasticity, fibre optics, and intermediate technology to suit Indian conditions.

The meeting was successful in providing strong motivation and the application of scientific principles to real life situations.

There were 27 participants representing chemistry, physics and biology teachers.

24 DIRECTORY OF LOW COST SCIENCE TEACHING CENTRES

This new volume compiled for the British Council by Mr Norman Lowe (UNESCO consultant) contains the results of a world wide survey of both Commonwealth and non-Commonwealth countries. Each entry gives details of addresses, present stage of development, comments etc. Separate sections deal with training facilities related to equipment production available in Britain, and a bibliography of useful reference data dealing with low cost equipment production.

Copies of the draft edition will be forwarded to British Council Representatives in the near future. The final edition will be available for sale during 1980.

25 NEWS FROM RECSAM, JULY 1979

RECSAM will incorporate environmental education in all its training and curriculum courses in science and mathematics under its third five year programme which begins from July next year. Other activities include:

1 Conference on Chemical Education in Developing Countries 19-21 April '79

The meeting concentrated on tertiary education and its links with secondary schools and industry as most graduates are absorbed into secondary school teaching and the remainder into industry and further training.

The meeting identified several points of common agreement:

(i) Exchange of information could be improved within developing countries.

(ii) Technician training is needed to overcome the common problem of poor maintenance and non-use of expensive instumentation. Regional centres and workshops for technician training are required.

(iii) Provision of low cost teaching/learning aids was considered to be an urgent need in view of inadequate finance and large student numbers experienced by all universities.

(iv) Regional centres are needed to train university teachers and instructors.

(v) Regional workshops, conferences or short courses on specific topics of high interest level could be supported and should be conducted by specialists from within the member regions.

2 Inexpensive Materials and Equipment for Teaching Science and Mathematics

The project is carried out at the Faculty of Science, Srina Kharinwirot University, Bong Sein Campus, Thailand and extends from October 1978 to October 1980.

The objectives are to identify local materials for use in science laboratories, to construct simple inexpensive apparatus for teaching science and mathematics in schools, and suggest to teachers how to make and use apparatus for teaching science and mathematics.

26 NIGERIA: THE BENDEL SCHOOLS SCIENCES PROJECT COMPETITION

The Bendel State Branch of the Science Teachers' Association of Nigeria (STAN) have decided to try a new approach to the annual problem of organising a science fair in the State. In the past State Science Fairs were only moderately successful because of two main constraints. These were:

1 the lack of financial support for any science teacher who wanted to embark on a research project with his students, and

2 the lack of any coherent support system for such teachers. It was clear that teachers needed a central source of ideas, information and encouragement if they were to continue their work and bring their research projects to fruition.

Consequently it was thought essential that these restraints be removed if any real improvement in the quality of school project work was to be achieved.

Initially, Guinness (Nigeria) Ltd., were approached as possible sponsors for this new-style of competition and they generously agreed to cover the costs of the whole exercise. A donation was also made by the STAN executive. It was decided to allocate the money in two ways. Firstly the participating schools were to be given a sum of money to enable them to cover the costs of their project work and secondly, a sum was budgetted for cash prizes that would be awarded to both the teachers and the students involved in the winning projects. In this way it was hoped to remove the financial constraints and also provide a great deal of encouragement to the participants.

In order to support and guide the teachers it was decided that the schools should be given the outlines of five projects from which they were to choose one. The projects outlined were:

(i) A vitamin C survey of fruit
(ii) A river pollution survey
(iii) A chicken feeding experiment
(iv) A myopia survey of the local population
(v) A model solar water heater.

The outlines of the projects contained suggestions as to what might be done, how it might be done and what the judges would be looking for in their assessments. Plenty of scope was to be left for individual initiative.

Since the competition was to be tied to a budget, only a limited number of schools could be invited to take part. In this case fifteen schools were invited. At the present time all the schools have been contacted and they are in the process of returning their application forms to the Science Branch of the Ministry of Education which is acting as the headquarters for the competition.

At a later date the schools will submit a report of their work for assessment by a panel of judges and a cash prize will be given to the best report on each project. Then all the participating schools will be invited to Benin City, the State capital, in order to display their work at an exhibition. Again, prizes will be awarded for the most effective displays.

This method of organising a science fair owes its origins to a similar scheme initiated by Mr David Guard, the then Adviser to the Residential Science Schools in Kuala Lumpur, Malaysia, in 1976. In that case the sponsorship came from Esso Ltd., and the whole project arose out of the Anglo-Malaysian Educaional Collaboration (AMEC) Scheme.

Thsi competition in Bendel State is seen both by STAN and Guinness (Nig) Ltd as a pilot scheme. If it is successful then it will become an annual event with, perhaps, a wider participation. It is thought possible that the scheme may eventually be enlarged into a national event.

The organisers are hoping that, with most of the constraints removed, a true picture will emerge of the level of scientific ability among its teacher and student population. It is also hoped that interest will be generated in a more practical approach to science teaching in the schools.

Further details on the competition may be got from:

J T Clifford
(British Council ACTS Officer)
c/o Science Branch
Ministry of Education
PMB 1058
Benin City
Bendel State
Nigeria.

27 THIRD WORLD SCIENCE

With the aid of a small grant from the Overseas Development Fund a team at University College of Swansea under the direction of Dr I W Williams has set up a project to collect information on as many topics as possible, from developing countries, that are of scientific interest and that could be used in secondary schools to enliven science lessons. It is hoped that the use of such material will also help to create an awareness of the needs and potential of the Third World. The project is particularly interested in gathering examples of traditional crafts and technologies, examples of which include:-

(i) Village soap production from banana skin ashes and vegetable oil
(ii) Fermentation and distillation techniques
(iii) Methods of cooling water in hot climates
(iv) Traditional methods of iron smelting
(v) Traditional housing and its adaptation to climate
(vi) Agricultural techniques, irrigation methods etc.
(vii) Herbal medicines and traditional cures.

After collecting enough ideas the information will be presented initially in sheet form for use by interested teachers in Britain. However, if enough ideas are forthcoming the information sheets may prove useful in the countries from which the material originated. Help is still needed and we would be pleased to receive information from anyone who has any knowledge of topics which would be suitable. The information should be written on not more than two sides of A4 paper, with full reference made to any material which is not original. Photographs which may be reproduced would also be appreciated. All articles will be acknowledged.

Please send material to:

Dr I W Williams
Third World Science Project
Department of Educaiton
University College of Swansea
Hendrefailon
Swansea
West Glamorgan SA2 7NB, UK.

28 CULTURAL CONTEXTS OF SCIENCE AND MATHEMATICS EDUCATION

In recent years there has been growing world-wide concern with the influence of social and cultural factors on the goals, design and implementation of school science and mathematics curricula. In order to assist educationalists who are interested in this field, an annotated bibliography is being compiled, covering the following aspects: psychological (including research into concept development in science and mathematics), pedagogical, religious/philosophical, linguistic, economic, political and sociological.

The bibliography will be confined to material in English, and emphasis will be placed on work in developing countries. It will include both published and unpublished items, covering research studies, reference books and articles, resource materials for teachers and curriculum materials for pupils. It will deal with science and mathematics at all school levels, but not at tertiary level.

The compilation is being undertaken by Mr Bryan Wilson, of the British Council's Schools and Further Education Department, working from the Centre for Studies in Science Education, University of Leeds, Leeds LS2 9JT. Mr Wilson would be pleased to receive information on items that should be included. It is hoped that the Centre will publish the bibliography in early 1981.

29 CHEMICAL EDUCATION IN THE COMING DECADES

This report contains accounts of the leading contributions at the International Symposium on Chemical Education, held from 25-30 August 1977, and the European Seminar on Chemical Education which took place from 30-31 August 1977 in Yugoslavia.

The proceedings were supported by UNESCO, the International Union of Pure and Applied Chemistry, the Federation of European Chemical Societies, the Union of Yugoslav Chemical Societies and the University of Ljubljana.

The meetings were organised as an attempt to identify some of the major problems in chemical education for

the future, especially with respect to the changing needs of society, the developmental nature of chemical science, students' aspirations and attitudes and the particular requirements of developing countries.

The contributors included Dr A Vrhtusa, Vice President, Federal Executive Council Belgrade, Yugoslavia, J Berrard (France), William B Cook (Colorado State University), George S Hammond (University of California) M J Frazer (University of East Anglia). George C Ponertal (University of California) H Buchowski and A Gorski (Polytechnika Warszawaka) E Apea (Commonwealth Secretariat), M Laffitte (University of Provence), J Maclockova (Prata) and A Swota (University of Bratislava).

The report is edited by Aleksandra Kornhauser, and published by:

Ddu Universum Publishing House
Parmova 39
P.O.B. 106
61001 Ljubljana
Yugoslavia at US$15 per copy.

30 EUROPEAN EDUCATION COOPERATION AND THE UK

1 The European Economic Community (EEC)

There are two main aspects of educational cooperation within the Community. The first dealing with European unity eg the education of the children of migrant workers and relations between member states. The second aspect is concerned with equality of opportunity and provides for cooperation in a field of education which can enhance equality considerations. Some of the main current activities are:

(i) Preparatory study of pre primary education in Community countries.
(ii) The teaching of foreign languages in the Community.
(iii) The European Community and European Studies in schools.
(iv) Equal opportunities in education and training for girls.
(v) Transition from school to work and adult life.
(vi) Government studies in higher education.
(vii) Adult Education.
(viii) Short study visits to member states.

2 The Organisation for Economic Cooperation and Development (OECD)

The educational work of OECD began in the 1960's. The main concern is with the comparison and analysis of future policies in member countries. There is a separate small programme on educational building. Activities include:

(i) Early childhood study.
(ii) Policies for basic education.
(iii) Young people and work.
(iv) Policies for post compulsory education.

3 THE OECD: Centre for Educational Research and Innovation (CERI)

The organisation promotes research and development activities in education. The budget is separate from the OECD funding.

The current activities include:

(i) The changing needs of young people.
(ii) Failure and underachievement in schools.
(iii) Special education and the handicapped.
(iv) National analysis, assessment, innovation and research.
(v) Innovations in higher education.
(vi) Adulthood and the recurrent education response.

4 Council of Europe

The Council for Cultural Cooperation (CDCC) was set up in 1962 to administer the cultural and educational programme of the Council of Europe.

Some activities include:

(i) From birth to eight. Young children in European society in 1980's.
(ii) A modern languages project.
(iii) Cooperation in Europe since 1945.
(iv) Preparation for life.
(v) Reform and development of tertiary education.
(vi) The situation of foreign students in member countries.
(vii) Development of adult education.

31 WATER POLLUTION IN ENVIRONMENTAL EDUCATION CURRICULA

The author of this comparative study first deals with the need to define 'environmental education' and 'curriculum'. This leads to the identification of five current projects from four countries for further study.

In all of the units, aspects of water pollution were an important source of study. The support provided by experts to the projection of curriculum content helped the acceptance of the units by schools, but the educational objectives differed considerably. The possibility of experimentation and use of intellectual skills was a factor in the choice of water pollution and the degree of integration in the curriculum was variable too.

The materials of the curriculum correspond to the role which teachers and students will play in the project. Controlled experiments and uncontrolled tests of water probes occur in the studies and formal hypothesising occurs in projects which have a strong social flavour. There is an inverse ratio between data collecting and data analysis and all projects expect from their students analytical and critical reading which is not exercised systematically.

This is a very useful study for those seeking to gain concise information about some recent environment curricula and specifically those who are interested in the comparative aspect of curriculum development.

The study, by Abraham Blum, is published by the Institut für die Pedagogic der Naturwissenschaften and der Christian Albrechts Universitat, Olshausenstra 40—60 D—2300, Kiel 1.

32 INTERNATIONAL SYMPOSIUM ON TRENDS IN SCIENCE EDUCATION, HALIFAX, NOVA SCOTIA, AUGUST 1979

The Conference was organised by Dr Charles McFadden on behalf of The Atlantic Institute of Education, Halifax, Educators of Atlantic Science Teachers, Inc. and the Nova Scotia Association of Science Teachers. Support also came from The International Council of Associations for Science Education; The International Council of Scientific Unions (Committee on the Teaching of Science); The National Science Teachers Association, USA; The British Council; The USSR Academy of Sciences; The Canadian Commission for UNESCO, The Canadian National Development Agency, The International Development Research Centre of Canada, The Social Sciences and Humanities Research Council of Canada, UNESCO and various national organisations which supported delegates.

About ninety delegates attended the conference, representing twenty-one countries. The larger groups were from Canada, the USA and the UK. There were sixteen representatives from developing countries and two from Socialist countries.

The conference programme was arranged as a series of main lecture presentations, other concurrent lectures and concurrent discussion groups. The main themes of the conference were:

1 Perspectives on Science Education — Science Education and the Future.
(Four main lectures and a discussion group meeting).

2 Curriculum Development for the Future.
(Twenty-two concurrent lectures in six sessions and a discussion group meeting).

3 Science Education and Personality
(Panel discussion and discussion group meetings).

4 The Role of Technology in Science Education in the Future
(Two main lectures and a discussion group meeting).

5 The Organisation of Science Education in the Future
(Two main lectures and a discussion group meeting)

6 Education for Mankind's Future — The Social Content of Science Education
(Two main lectures, three concurrent lectures and a discussion group).

7 Science Teacher Education for the Future
(Twelve concurrent lectures in four sessions and a discussion group meeting).

8 Future Tasks in Education Research
(Five concurrent papers in two sessions and a discussion group meeting).

9 International Cooperation and Collaboration in Science Education Improvement
(Three main lectures and a group meeting).

In lectures and discussions some common matters of concern were evident as were national differences with regard to education. A close link with political decisions was evident. The 'shortage' of equipment and falling rolls of the developed countries contrasted with the need to establish universal secondary education in other countries. The need for improved teacher training and in-service education was a recurrent theme. There was some agreement between educational research workers and the few practising teachers concerning the gulf which exists between the classroom and research. There seemed a lack of influence of research upon practice and a failure of research to deal with actual problems as they were perceived by teachers. This is possibly because the teacher's problems occur in a multivariable situation when it is not possible to establish a control group to enable the contributing factors to be isolated. The conference provided a valuable sharing of aims and discouragements over a wide range of science education experience.

33 SCIENCE EDUCATION WORKSHOP, BHOPAL

A workshop on the teaching of science at the +2 stage was held between 3 and 8 September, 1979, at the Demonstration Multipurpose School, Regional College of Education, Bhopal. The workshop was part of the collaborative programme between British Council and CBSE; most of the nine CBSE teachers who had spent the previous year in Britain attended as resource persons as well as 3 tutors from Centre for Science Education, Chelsea College, University of London. The programme covered several general topics such as assessment and teaching aids, as well as considering the teaching of specific topics in Biology, Chemistry and Physics.

Physics

In physics the specific subject taken was the teaching of waves. One encouraging outcome of the workshop was that several of the activities suggested by the group who had the year's experience in London, were further modified and adapted to local conditions during the course of the workshop.

Biology

The Biology workshop was underpinned by two important principles:

(1) how to reduce rote-learning to a minimum

(2) how to manage with minimal equipment.

Chemistry

Much of the work undertaken in the chemistry workshop was based on a number of sections from the draft curriculum guide material on chemical bonding and structure. The sample materials were presnted and discussed at length, and formed the basis of further sessions on teaching aids.

34 REPORT OF INTERNATIONAL SEMINAR IN MATHEMATICS EDUCATION: DEVELOPMENT OF TEACHING MATERIALS FOR SCHOOL MATHEMATICS, SWAZILAND 1979 (SEN 39:31)

The keynote address entitled 'The Development of Teaching Materials-Past & Present' was given by Dr A G Howson of the Department of Mathematics, University of Southampton UK. Mr John Hersee, Executive Director SMP, delivered a lecture on 'The SMP Today' which included a summary of the major changes undergone by SMP during the last 16 years. Lead and background papers were presented by each country delegation.

The six major names considered by participants, working mostly in discussion groups were,

— Aims in Secondary Mathematics for a Wide Ability Range
— Mathematics in Society
— Language Problems
— Mathematics Content: Criteria for Selection
— Format, Style, Illustration and Design of Pupils Materials
— Production, Publication and Dissemination of Materials. Teacher Education

A detailed 110 page report has now been published which includes all lead papers and summaries of the related discussions. Copies of the report can be obtained by application to SFED, The British Council, 10 Spring Gardens, London SW1A 2BN.

35 DIRECTORY OF SCIENCE TEACHERS' ASSOCIATIONS WORLDWIDE

A new edition of this Directory, sponsored by ICASE, has recently been published by the ASE. It contains amendments and revisions up to November 1979.

Copies of the revision sheets are being sent to all member associations of ISASE.

Copies of the new edition of the Directory may be obtained from the Executive Secretary ICASE, British Council, 10 Spring Gardens, London SW1A 2BN, UK at $10 US each.

36 ICASE EUROPE: ENERGY AND ENVIRONMENT EDUCATION IN EUROPE SEMINAR: MONTE CARLO, MARCH 1981

This seminar, which will take place from 28 — 31 March 1981, is planned for science teachers, teacher educators, policymakers and industrialists to consider the major issues of energy resources and demands and environmental concerns in Europe and to examine their relevance to modern science education. The language spoken will be English. Further information can be obtained from:

Ms Sheila Hopkinson
c/o The British Council
10 Spring Gardens
London SW1A 2BN

37 CORRECTION — INTERNATIONAL CONFERENCE ON CHEMICAL EDUCATION: DUBLIN, AUGUST 1979 (SEN 40.40)

In Science Education Newsletter for September 1979 it was incorrectly reported that this conference was one of a series sponsored by UNESCO. In fact, UNESCO gave generous financial support but the sponsors were the International Union of Pure and Applied Chemistry (IUPAC), Federation of European Chemical Societies (FECS), the Royal Irish Academy, the Institute of Chemistry of Ireland and The International Council of Associations of Science Education (ICASE). The previous international conference on chemical education took place in Ljubljana; the report on it 'Chemical Education in the Coming Decades' is reviewed in paragraph 29 of this issue.

38 SOUTH AFRICA: SCIENCE EDUCATION PROJECT NEWS (SEN 38: 19, 40.31)

As originally planned, the development phase of the Science Education Project comes to an end during the first half of next year. This means that from next year onwards the main focus will be on the implementation of the S.E.P materials and goals.

Plans for 1980

Over the next three years, it is planned to equip all secondary schools in Soweto with S.E.P. materials, and run a continuing series of orientation courses to help teachers implement the new materials effectively. Procedures for doing this, and the training of personnel was completed during the pilot project in Soweto. Twenty new schools in Soweto will be included in the Project as from the beginning of 1980, under the guidance of Daryl Hamlyn.

In Durban, a pilot implementation project will go into operation next year in two Kwa-Mashu and four Umlazi schools. This will be undertaken by Brian Gray.

In the Transkei, the Project continues to expand gradually as funds become available. Norman Curry, lecturer at Cicira Training College, and Chairman of the Transkei Science Teacher's Association, has taken the additional responsibility of helping with the implementation of the Project in the Transkei.

The trial use of the S.E.P. materials in some Indian schools continues during 1980. The two existing schools in Durban will be supplemented by an additional two schools in the Johannesburg area.

Publications

The Editor, Heather Downing, with help from other members of the Project staff, has faced the daunting task of preparing twenty publications for printing for 1980.

As a result of the language study undertaken during this year, the worksheets will be brought out in two versions, first language and second language. Content-wise these versions are basically the same. However, in the second language version, the language is simplified by the use of one tense, avoidance of the passive voice, the elimination of embedded clauses, and so on.

Addison — Wesley will acquire the world-wide right to publish and distribute the S.E.P. worksheets, subject to final negotiation. Publication in Southern Africa will be undertaken by a partnership of Addison — Wesley and Shuter and Shooter.

The Teacher's Guides for the various test books, will most likely be published by the publisher of the text book concerned. Again, this is subject to final negotiation in some cases.

Kits

The content of the S E.P. kits has now been finalised. The revised and finalised versions of the kit will be available from next year onwards. The list of kits available is given below.

Science kit	)	
Balance kit	)	
Electricity kit	)	Std. 6 and 7
Force and pressure kit	)	
Chemistry kit	)	
Light kit	)	
Electricity kit 2	)	Std. 8
Chemistry kit 2	)	

The above kits are designed for group work. Normally, schools would be supplied with eight or more of these kits. In addition to these kits, there are two other kits designed in such a way that only one kit per school is supplied. These are:

Density kit
Biology kit

Details on these kits are available from this office, or directly from the manufacturers:

Scientific Teaching Aids
31A Fourth Ave.
PINETOWN
3601

Evaluation

During the past year, a tremendous amount of data concerning the implementation of the Project in the Ciskei has been gathered. Allyson MacDonald now faces the daunting task of sorting out and writing up her findings. The following reports are in various stages of completion:

- Analysis of the Std. 6 examination results
- Analysis of the Std. 7 examination results
- Analysis of the results of the practical test
- Analysis of the results of the science reasoning task test
- A report on the language study
- A report on classroom observation using the Science Teaching Observation Schedule
- A report on the children's attitude towards science in general and the Project materials in particular
- A report on teacher attitudes.

Although these reports have still to be finalised, initial indications show some very favourable gains in project schools in areas such as examination results, results of practical examinations and attitudes. Once these reports are available, you will be notified by means of a newsletter, and the reports will be sent out on request.

Allyson Macdonald will also be compiling a final evaluation report, which will be a summary of all the individual evaluation reports, together with her overall finding. This will be sent automatically to everyone who receives the newsletter.

STOP PRESS

39 ASSOCIATION OF TEACHERS OF MATHEMATICS (UK): EASTER COURSE, BOGNOR REGIS, 1980

The course is open to primary, secondary and college teachers interested in improving mathematics curricula and teaching methods. There is a list of over thirty seminar topics from which participants are invited to choose three. The programme leaves plenty of time for pursuing individual interests: there will be a workshop for games and practical activities, and one for microcomputers, as well as a bookshop and resources centre.

The course lasts from April 9th — [illegible] at the West Sussex Institute of Higher Education. Course fees are £43.00 for residents and £34.00 for non-residents, with reductions for members of the ATM. Further information can be obtained from:

The Executive Officer
ATM
Market Street Chambers
Nelson
Lancs BB9 7LN

40 ASE ANNUAL MEETING, HULL 1980: BRITISH COUNCIL SYMPOSIUM: THE MESSAGE AND THE MEDIUM (SEN 39, 41, 40.1)

A symposium was organised by the British Council at the Annual Conference of the Association for Science Education, Hull 1980.

In this symposium it was decided to concentrate on some problems of production — from typing and duplicating to full scale publication — of printed science curriculum materials.

The selection of materials by teachers, and the impact of those materials on pupils, are radically influenced by the immediate appearance and ease of use of the books and worksheets. However, science curriculum projects throughout the world are manned by teachers and other educators whose expertise is primarily in aspects of science education such as science content, learning theory, evaluation, and teacher training. These individuals often have no formal training, or even experience, in fields such as readability, design and layout, the use of illustration, or techniques of duplication. An enormous amount of specialist expertise and hard work goes into the planning, trialling, evaluating, and implementing objectives, topics, experiments, and test items. Much of this may go to waste if the printed material is unattractive or difficult to read with comprehension.

Curriculum projects often start with the local production of teachers' guides, and worksheets. Even at the first draft stage immediate impact is important, and significant improvements may be made by using relatively simple techniques with duplicator stencils. At the same time, project directors should be aware of the professional services that can be offered by commercial publishers. They often think of talking to publishers when their material is near completion, but their particular specialisms are too valuable to be left to the end. The advice of a

publisher early in a project can ensure that plans for material production are realistic, and can greatly increase the quality of the final product.

The programme for the seminar was as follows:

1 Introduction Philip Adey, British Council Schools and Further Education Department

2 Improving the Image Nick Cutler, Gestetner Ltd., discussed some common faults in the design of duplicated material, and some simple techniques for improving its impact. Using a variety of examples he showed a few of the ways which can be used by writers to make the page more appealing, and so more successful in reaching its educational objectives. Mr Cutler indicated the uses of different types of stencils, and demonstrated them.

3 William Anderson, Publications Manager of the Nuffield Chelsea Curriculum Trust, introduced an **exhibition** which showed some of the processes and problems involved in producing a finished professional publication from an author's manuscript. Writers are sometimes not aware of the complexity of the publishers' job, nor of the number of different specialists who contribute to the production of a science textbook. The Nuffield-Chelsea exhibition used a number of the well known Nuffield science publications to illustrate these processes, and demonstrated the use of various modern design and production techniques.

As well as the Nuffield-Chelsea exhibit, there was a demonstration of the hectograph technique of duplicating, and a display of curriculum material from various parts of the world, including Botswana, Lesotho, Swaziland, Canada, The Gambia, Hong Kong, Nigeria, The Philippines, and Singapore.

4 A Teacher-Author's Experience
C K Kikshit, of the Doon School in Dera Dun, India described some of the problems and rewards encountered in the production of a physics activity book for lower secondary pupils. Mr Kikshit was one of six teachers in various schools who formed a physics study group in the All India Science Teachers Association. The first draft of the activity books that they wrote was duplicated for trials in their own and other schools. The books were adopted by NCERT (the National Council for Educational Research and Training), published by a Delhi publisher, and have since been translated into two other languages.

5 The Publishers' Viewpoint Hamish MacGibbon, Deputy Managing Director of a major British Educational Publisher, talked about the role of the publisher in science curriculum development, especially in some third world countries. Publishers are sometimes portrayed as wolves out to squeeze as much profit as possible from parents and Ministries of Education, while giving as little service as possible in return. Mr MacGibbon discussed ways in which a reputable publisher can advise and help authors and curriculum projects to ensure that they get the best value, and the best quality product possible in any given circumstances. He also talked about the help authors can give publishers in the initial preparation of manuscripts.

6 Open Forum An opportunity for everyone to ask questions of the speakers, to relate their own experiences, and to discuss the morning's presentations or related matters.

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